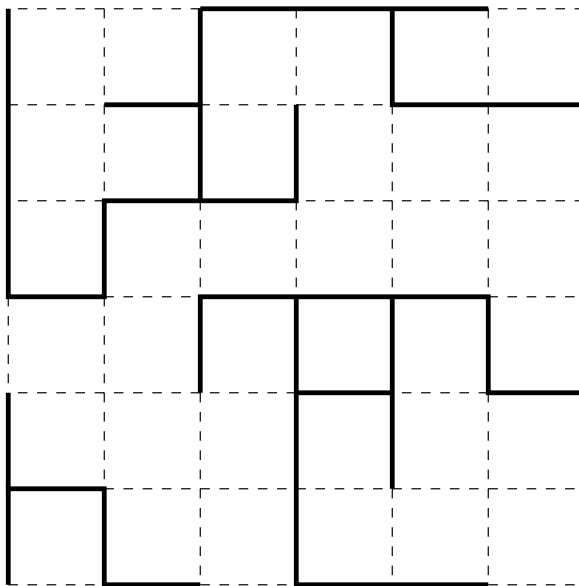


## Spin Glass

Consider the  $7 \times 7$  grid drawn below. Given an assignment of signs (+ or -) to the vertices of this grid, a *violation* corresponds to either a thick (solid) edge with two different signs at its endpoints or a thin (dashed) edge with identical signs at its endpoints. The goal is to find an assignment of signs which minimize the total number of violations in the grid.



Violations if	+	-
	+	-
	-	+
	+	+
	-	-
	-	-

As you'll probably realize, although finding a "good" assignment of signs might not be that difficult, providing a proof that your solution is optimal is in fact much more challenging (and a short proof exists for any instance).